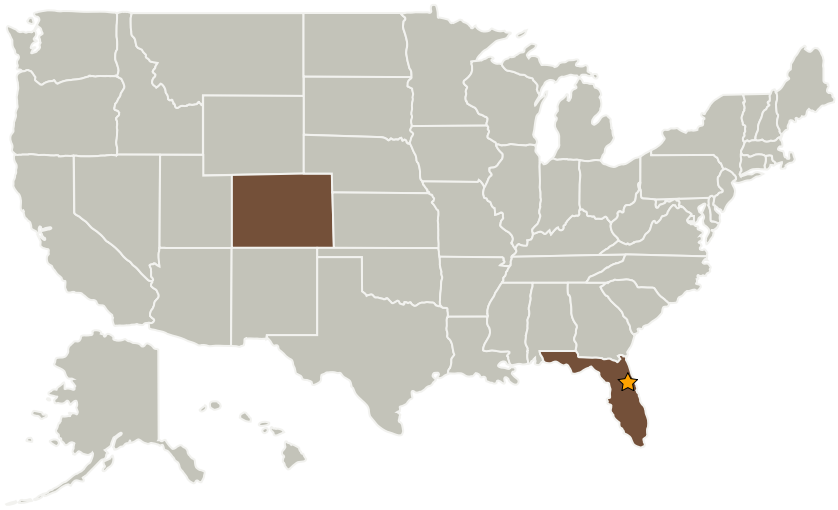
Expandable Cryogenic Tankage for On Orbit Depot Storage, Phase I

Completed Technology Project (2005 - 2005)

Project Introduction

The proposed expandable depot storage tanks would make it possible to have an on-orbit tank larger in volume than any existing or planned launch vehicles. The size of the tank would be diameter limited by the launch vehicle, but not limited in length. It would take several additional launches to fill the depot tank for use. Because of the light load on launch the inner tank support system could be much lighter and less conductive than that required for loaded tanks and thus have low thermal loads for the final tank configuration. The tank could be fully assembled before launch which would greatly reduce on-orbit problems. Materials can be selected to give optimal configurations with different cryogenic fluids. The entire tank could be configured to have a zero loss rate by the use of cryogenic reliquefier(s). Protection against micrometeorites and monatomic oxygen would be built into the outer surface of the tanks. The inflatable storage tanks will have many additional military and commercial applications in space in the arena of storing large quantities of fluid for laser fuel, space tugs and long duration space flight. The primary use will be in cases where the required fluid volume is greater than can be achieved with a single launch vehicle.

Primary U.S. Work Locations and Key Partners



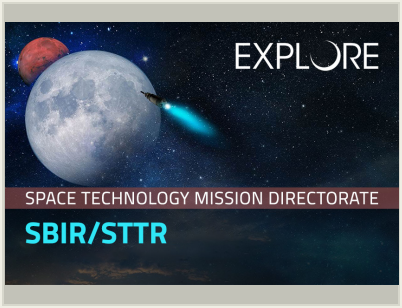


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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Kennedy Space Center (KSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Supercritical Thermal Systems, Inc.	Supporting Organization	Industry	Longmont, Colorado

Primary U.S. Work Locations	
Colorado	Florida

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Harold Gier

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems
    - TX14.1.2 Launch Vehicle Propellant